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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,231	02/01/2001	Han-Sin Lee	SAM-167	9048

7590 10/24/2002

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EXAMINER

POMPEY, RON EVERETT

ART UNIT PAPER NUMBER

2812

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/775,231	LEE ET AL.	
	Examiner	Art Unit	
	Ron E Pompey	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 July 2002.
- 2a) ☒ This action is FINAL.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2 and 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laparra et al. (US 6,319,796) and in further view of Park et al. (US 6,326,282) and Shin et al. (US 6,184,077).

Laparra discloses the steps of:

For claims 1, 2 and 4-6:

etching the exposed semiconductor substrate, using the etching mask pattern as an etching mask, to form a trench;

providing a material layer (40b, fig. 4) on the insulating layer (40a, fig. 4) filling the trench;

planarly etching the material layer and the insulating layer down to a top surface of the etching mask pattern to form a device isolation layer pattern in the trench; and

removing the exposed etching mask pattern (col. 4, lns. 5-10 and col. 5, lns. 51-56).

3. Laparra discloses all the steps of claims 1-12 except those described below.

However Park discloses the steps of:

For claims 8-12:

prior to forming the insulating layer:  
forming an oxide layer (112, fig. 2D) on the inner wall and bottom of the trench;  
forming an oxidation barrier layer (114, fig. 2D) on the oxide layer; and  
further comprising forming a capping layer (115, fig. 2D) between the oxidation barrier layer and the insulating layer (col. 4, lns. 29-52).

Therefore it would have been obvious to those of ordinary skill in the art to combine Park with Laparra, because the layers disclosed by Park are protection layers for the trench.

4. Laparra and Park disclose all the steps of claims 1, 2 and 4-12 except for the material layer being formed being formed at a temperature of 500°C and higher and forming an etch-stop layer comprising polysilicon and a HTO layer which are sequentially stacked. However, the examiner takes official notice that an LPCVD TEOS film is formed in the temperature range of 500°C and higher as can be seen in Shin column 5, lines 16-18. Also, that it would have been to one having ordinary skill in the art at the time the invention was made to form an etch-stop layer, comprising polysilicon and a HTO layer which are sequentially stacked, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

### ***Specification***

5. The disclosure is objected to because of the following informalities: Applicant claims, in claim 9, a thickness range of 20Å - 300Å. However the specification only states a thickness range of 20Å - 200Å. Also, Applicant claims, in claim 10, an

oxidation barrier layer comprising silicon nitride. However the specification does not state what the oxidation barrier layer is comprised of.

Appropriate correction is required.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-2 and 4-12 have been considered but are moot in view of the new ground(s) of rejection.

The applicant has further limited the scope of the claimed invention by adding the claimed language of high-temperature oxide (HTO) instead of just an insulating layer formed at a temperature of 500°C and higher which was disclosed in the Laparra reference. The examiner only presented the Shin reference to disclose that an LP Teos process forms an insulator at a temperature in the range of that claimed for an HTO layer and therefore the official notice has stronger bases. The rejection as stated above reads on the claimed limitations and is upheld. Also the Examiner would like for the applicant to address the objections to the specification reiterated from the previous office action mailed 3-14-02.

### ***Conclusion***


7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (703) 305-3016.

  
Ron Pompey  
Art Unit: 2812  
October 21, 2002

John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800